K Basin Closure Project

Restore the River Corridor - Transition the Central Plateau - Prepare for the Future

K East Basin has leaked in the past. K East sits less than 500 yards from the Columbia River.

The K East Basin will be removed — it will be grouted, cut up, and disposed of in ERDF.

Sludge covers debris in the K East Weasel Pit.

The K East Storage Basin has several different "compartments."

Background

Hanford's spent nuclear fuel is uranium-based fuel that was irradiated in a reactor as part of the process used to produce plutonium. When fuel-reprocessing operations were stopped in the late 1980s, Hanford was left with about 105,000 irradiated, solid uranium metal fuel assemblies, representing approximately 2,100 metric tons of spent nuclear fuel. The fuel, which was ultimately stored in water-filled basins attached to the K East and K West Reactors, represents almost 80 percent of the U.S. Department of Energy's nationwide inventory of spent fuel.

The fuel stored in the K West Basin was packaged and sealed in canisters, while fuel in the K East Basin was stored in open canisters exposed to the basin's water. Irradiated fuel corrodes easily, and therefore, is not suited for long-term wet storage. As a result, nearly 6,000 fuel assemblies became severely corroded and another 3,000 were damaged. Some of the fuel was so corroded, especially in K East Basin, that it disintegrated to small particles that collected at the bottom of the basins as a layer of radioactive "sludge." The sludge contains fuel corrosion particles, fuel fragments, corrosion particles from metal products and equipment, wind-blown sand, pieces of corroded fuel cladding, and PCBs. A substantial amount of larger debris also accumulated in the basins.

The K East and K West Reactors and their attached basins sit approximately 1,400 feet from the Columbia River. The basins, which were built in the 1940s, were not designed to store spent fuel for decades. Each basin contains roughly one million gallons of water, which has become highly contaminated with long-lived radionuclides. The spent nuclear fuel, sludge, debris, and water in the K Basins contain about 55 million curies of radioactivity. The amount of contamination in the basins, and the potential for them to leak enough to impact groundwater (e.g., KE Basin 1976-79, 1993), makes the K Basins one of Hanford's most urgent threats to human health and the environment.

Strategy

The overall strategy for the PBS RL-0012 K Basin Closure Project is to progressively reduce the most urgent threats posed to the public and the surrounding environment by the spent nuclear fuel, radioactive sludge, debris, and water at K Basins. The strategy for a series of actions was completed in October 2004 and the actions will be completed by fiscal year 2009.

Scope

This project has seven major objectives:

- Remove all the degrading spent nuclear fuel — approximately 2,100 metric tons — from wet storage in the K Basins, and package, dry and transport the fuel for interim on-site storage at the Canister Storage Building in the 200 Area (Central Plateau area of Hanford)
- Remove, treat, and package approximately 50 cubic meters of radioactive sludge (estimated to weigh approximately 18 metric tons) from the K Basins [In progress]
- Permanently dispose of the debris from the K Basins in the 200 Area [In progress]
- Transport the K Basin water to the 200 Area Effluent Treatment Facility (ETF) for treatment and disposal [In progress]
- Consolidate all non-defense production spent nuclear fuel in the 200 Area pending final disposition [In progress]
- Remove and dispose of the K Basins superstructures [In planning]
- Grout, saw cut, lift, and transport the Basin structures for disposal at the Hanford Environmental Restoration Disposal Facility (ERDF) in the 200 Area [In planning].

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Significance

The K Basin facilities are well past their design lives and pose a major threat to the environment due to the potential for releasing radioactive water to the surrounding soil and the Columbia River. Completing this project removes more than 55 million curies of radioactivity — better than 95 percent of the radioactivity in Hanford's River Corridor.

K East Basin

- Past due K East sludge containerization (TPA M-034-33B) March 2005 rescheduled to October 31, 2006
- Complete bulk containerization of sludge (DNFSB 119E) October 2006
- Complete removal of containerized sludge (DNFSB 120E) May 2007
- If required, complete removal of filter back flush sludge from the North Loadout Pit (DNFSB 122E) May 2007
- Complete removal of sludge (TPA M-034-34) May 31, 2007
- Remove the basin structure (TPA M-034-32) March 31, 2007
- Begin soil remediation (TPA M-016-57) April 30, 2007

K West Basin

Complete bulk containerization of sludge (DNFSB 119W) July 2007

- Complete sludge containerization (TPA M-034-35) 35(A) July 31, 2007, 35(B) January 31, 2008
- Begin treating sludge (TPA M-034-30) December 31, 2008
- Begin soil remediation (TPA M-16-58) April 30, 2009
- Complete removing and packaging containerized sludge (DNFSB 120W) November 2009
- Complete sludge treatment (TPA M-034-31) November 30, 2009
- Remove K Basins and their contents (TPA M-034-00A) March 31, 2009

Progress

Several major milestones have been accomplished in the past year:

- The K East Discharge Chute was grouted in August 2004. This grouting isolated the reactor from the basin and eliminated a suspected leak path for basin water through the construction joint
- Permanent water removal from K East Basin was initiated in September 2004
- Fuel removal from the K Basins was completed in October 2004
- Construction of the Sludge and Water Removal System was completed
- Sludge removal from KE Basin was initiated in late October 2004
- Removal of fuel canisters was completed in May 2005 [7,207 canisters removed]

In addition, the following activities are in progress:

- Approximately 60 percent of the currently estimated 50 cubic meters of sludge in the basins has been containerized in anticipation of treatment
- More than 90 percent of the Multi Canister Overpacks (MCOs) that contain the spent nuclear fuel have been welded
- Debris removal is continuing
- Preparations for eventually hydrolasing, grouting, and removing the K East Basin are in progress
- K West sludge containerization activities have been initiated

For more information

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